

ture of wooden piling was erected in order to provide a dry floor. The ornamentation on the pottery and other evidence point to the Neolithic age as the period during which the sites were in use.

An article on the structure of the Upper Cretaceous turtles of New Jersey is contributed by Mr. G. R. Wieland (*Amer. Journ. Sci.*, February). The genera *Adocus*, *Osteopygis* and *Propleura* are described and figured.

THE Hurricane Fault in the Toquerville district of Utah furnishes a theme for an essay on the effects of faulting on the scenery in the region of the Grand Canyon; it is written by Messrs. E. Huntington and J. W. Goldthwait (*Bull. Museum Comp. Zool.*, Harvard Coll. Geol. Series, vi. No. 5, February).

WE have received the report of progress for 1903 of the University of Texas Mineral Survey, which is under the direction of Mr. W. B. Phillips. The work is carried on with especial reference to economic geology. Attention is directed to the study of the clays of Texas, by Dr. H. Ries. Under a plan of cooperation with the Texas World's Fair Commission, Dr. Ries examined the chief clay producing districts in the State, and as a result there will be exhibited at St. Louis samples of the clays, to each of which will be attached a card giving the locality, chemical composition and physical characters, such as fusibility, plasticity, strength, colour on burning, proper temperature for burning, suitability for various purposes, &c.

AN interesting essay on periodic migrations between the Asiatic and the American coasts of the Pacific Ocean is contributed by Mr. J. P. Smith (*Amer. Journ. Sci.*, March). It is shown that the living faunas of the Japanese province and of the western coast of North America are rather closely allied with a large number of species in common, and they live under approximately the same conditions. Between them there lie the southern shores of Alaska and the Aleutian Islands, interrupted by the deep channel east of Kamchatka and in this region the warm Japan current is met by the cold current from the Bering Sea, whereby the Alaskan waters and those along the shores of California are tempered. At present the migration of shallow water species is stopped by the depth of the channel at the end of the Aleutian chain, and also by the cold water which extends south-westward from Bering Sea. A rise of 200 metres would close Bering Sea, cutting off the Arctic waters, and providing a broad land bridge between Alaska and Siberia. An uprise of this, or of greater extent, in recent geologic times would allow of the intermigration of marine Mollusca between the Japanese area and that of western America, and this is the only explanation of the present distribution of most of the species that are common to the two regions. By such changes we can understand the history of the past faunas, which do not form a genetic series, but rather one showing periodically diverse origin and characters. Thus the faunal relations between western America and eastern Asia from the Trias to the present were the same, Asiatic faunas alternating with periodically recurring invasions of the Boreal type. It is concluded, therefore, that there is no presumption against the contemporaneity of similar species in widely separated regions in the past.

ALL the volumes of the first annual issue of the "International Catalogue of Scientific Literature" have now been published, and the volumes of the second annual issue are appearing. The first catalogue of zoological literature is

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in two parts—one an authors' and the other a subject catalogue—and they are concerned with the publications of 1901. Of the second issue, we have received the volumes dealing with mechanics, physics, astronomy and bacteriology. The volumes can be obtained from Messrs. Harrison and Sons, St. Martin's Lane, W.C.

THE second number of *The Central*—the magazine of the old students' association of the Central Technical College—contains several articles of practical value. Profs. W. C. Unwin and A. G. Ashcroft describe the engineering course and laboratories at the college, Mr. R. S. Dahl gives an account of the design of small motors, Mr. J. M. Donaldson contributes an article on electric power in the City of Montreal, and the work of Dr. T. M. Lowry and Dr. E. F. Armstrong on the mutarotation of glucose is briefly described. A photogravure of Prof. Henrici forms the frontispiece of the number.

THE additions to the Zoological Society's Gardens during the past week include a Green Monkey (*Cercopithecus callitrichus*) from West Africa, two Bare-eyed Cockatoos (*Cacatua gymnopis*) from South Australia, presented by Miss Hester Forshaw; a Hairy-footed Jerboa (*Dipus hirtipes*) from Egypt, presented by Mr. A. Lethbridge; a Shining Weaver-bird (*Hypochera nitens*), a Common Waxbill (*Estrela cinerea*) from West Africa, an Orange Weaver-bird (*Euplectes franciscana*), three African Silver-bills (*Munia cantans*) from North-east Africa, three Banded Grass Finches (*Poephila cincta*) from Queensland, four Amaduvade Finches (*Estrela amandava*) from India, a Fire-tailed Finch (*Erythrura prasina*) from Java, a Red-headed Weaver-bird (*Foudia madagascariensis*) from Madagascar, presented by Mrs. M. Summers; a Potto (*Perodicticus potto*), an African Civet Cat (*Viverra civetta*), two Crowned Cranes (*Balearica pavonina*), a White-throated Monitor (*Varanus albigularis*) from Lagos, presented by Dr. McFarlane; a Loggerhead Turtle (*Thalassochelys caretta*) from tropical seas, deposited; an American Flying Squirrel (*Sciuropterus volucella*) from North America, a Boatbill (*Cancroma cochlearia*) from South America, purchased.

OUR ASTRONOMICAL COLUMN.

OBSERVATIONS OF EROS.—In one of the papers included in the *Decennial Publications* of the University of Chicago Prof. E. E. Barnard publishes the results of the micro-metrical observations of Eros made at the Yerkes Observatory with the 40-inch refractor during the opposition of 1900–1901. After describing the methods of observation and discussing the errors, he gives, in tabular form, the details of each of the 7500 individual "settings" made during the series of observations. He also gives the results of a set of observations which were made during 1898 and 1900, but have not previously been published.

At the time these measures were made the oscillations of the magnitude of Eros had not been recognised, but on looking through the records Prof. Barnard discovered that the planet had often been compared, in regard to its brightness, with the reference stars, and he therefore appends the actual notes regarding the relative magnitude which were made during the period September, 1898, to January, 1901, inclusive.

ORBIT OF THE MINOR PLANET CHICAGO (334).—Another paper of the *Decennial Publications* (Chicago) contains a discussion of the orbit of the minor planet (334) by Prof. Kurt Laves. In the introduction the author discusses the minor planets of the Hilda type in regard to their "libration," and gives, in algebraical form, the inequality which is the criterion of the existence of libration in the orbits of these bodies. He then discusses the development of the

"perturbative function," and gives the elements, step by step, for the determination of the orbit of (334).

ABSORPTION IN THE SOLAR ATMOSPHERE.—In an article published in No. 2, vol. xix., of the *Astrophysical Journal*, Mr. Frank W. Very discusses the cause which produces the apparent selective absorption of the more refrangible radiations emitted by the photosphere which takes place in the solar atmosphere. He points out that beyond certain limits the increased depth of an "emission" layer does not increase the radiating power owing to the fact that beyond these limits the increased emission is counterbalanced by the increased absorption in the outer layers; similarly the line absorption produced by a gas does not increase indefinitely with the depth. For this reason he believes that the absorbing atmosphere is everywhere deeper than is actually essential to produce the absorption observed; and consequently it makes little or no difference whether the emission and absorption take place at the centre or the edge of the solar disc. Mr. Very contends that the apparent selective absorption is due to "selective scattering" rather than to "absorption," the more refrangible radiations being scattered and reflected by the small particles which float about in the solar atmosphere; further, he thinks that the scattering does not take place solely in a thin layer immediately above the photosphere, but is active even in the limits of the outer corona. Whereas "absorption" would require that the absorbing medium should become heated "selective scattering" does not, for the radiations are simply reflected.

This theory explains the nearly constant radiations of sun-spots when nearing the limb by supposing that spots, being cooler than the photosphere, only emit, at any time, the less refrangible radiations which are not affected by the extremely fine particles that cause the scattering.

WAVE-LENGTH OF THE GREEN CADMIUM LINE.—It has been noticed by many spectroscopists who are interested in the determination of absolute wave-lengths that the wave-length of the green cadmium line at λ 5086 as determined by M. Hamy (*Comptes rendus*, No. 130, p. 490, 1900) differs considerably from the value obtained for the same line by MM. Michelson and Benoit. This discrepancy is now accounted for by M. Ch. Fabry, who shows that under the conditions obtained by Michelson in a tube of cadmium vapour with electrodes the line is a close doublet, whereas in the tube used by Hamy without electrodes it is a triplet, and the latter observer measured the less refrangible component which does not appear under the former conditions. M. Fabry has determined the interval between the component measured by Michelson and the extra line measured by Hamy, and has found that on taking the value of this interval into account the apparent discrepancy is reduced from 15 in 1,000,000 to 3 in 10,000,000 (*Astrophysical Journal*, No. 2, vol. xix.).

A BRIGHT METEOR.—Mr. Roland Mott writes to say that on March 22 he observed a bright meteor from a position four miles west of Gloucester. "The meteor was in the north-eastern sky, and first appeared at an altitude of about 45 degrees from the horizon, falling directly towards the earth. It had the appearance of a brilliant arc lamp, and far outshone the stars of the Great Bear, although they and the moon were very bright. The time was 9.58 p.m."

SPECTRA OF MIXED GASES.—From a number of experiments made in order to ascertain the reason of the predominance of one spectrum over another in a mixture of gases, Mr. P. G. Nutting, of the National Bureau of Standards, Washington, has arrived at the definite conclusion that at such low pressures (0.1 to 10 mm.) as obtain in a Plücker tube, and under a homogeneous excitation of not more than 10 milliamperes, "the spectrum of a gas of greater atomic weight will be the brighter."

During his experiments he has found that neither the relative quantities nor the metallic or non-metallic character of the vapours present affect this result. The introduction of one molecule of mercury into three thousand molecules of hydrogen will reduce the brightness of the hydrogen spectrum at least one half, and sulphur and iodine (non-metals) are nearly as effective in causing this reduction as is mercury.

About eighty combinations of the fifteen readily vapour-

isable elements have been studied, and it is hoped to extend the results by using quartz tubes in which even copper and silver may be vapourised.

In concluding his communication Mr. Nutting discusses the effects of chemical combination on these results, and the explanation of the latter afforded by the modern electron theory (*Astrophysical Journal*, No. 2, vol. xix.).

RETURN OF THE NATIONAL ANTARCTIC EXPEDITION.

THE *Discovery*, with the members of the National Antarctic Expedition on board, arrived at Lyttelton, New Zealand, on April 1, accompanied by the relief ships *Morning* and *Terra Nova*. The news of the safe return of the expedition has been received with satisfaction; and there is every reason to believe that the scientific results obtained will make the expedition a noteworthy one in the records of polar exploration.

The *Discovery* left England in the summer of 1901 and reached Lyttelton on November 23 of that year. A few weeks later the vessel sailed for the Antarctic, and the first news of the work accomplished was brought back by the relief vessel *Morning* in March of last year (*NATURE*, vol. lxxvii. p. 516). It was evident from the information then received that the expedition had already achieved great success both as regards exploration and scientific observation, but some anxiety was felt as to the chances of the *Discovery* being released from the ice during the southern summer just passed. When the winter quarters of the *Discovery* were found, the ice prevented the *Morning* from approaching the vessel to a less distance than eight miles; and the transfer of coal and provisions had to be done by means of sledges. As the *Discovery* only had provisions to last until January of this year, it was considered necessary to send out two vessels to relieve the expedition and bring back the members if the ship could not get free. The *Morning* and *Terra Nova* were therefore equipped for this purpose, and sailed from Hobart on December 5, 1903, and reached the edge of the ice on January 5 of this year. There were then seventeen miles of ice between the *Discovery* and the sea, but heavy weather and explosives assisted this to break up, and in the middle of February the vessel was in open water.

Commander Scott's report upon the results of the first year's work in the Antarctic was summarised in *NATURE* of July 30, 1903 (vol. lxxviii. p. 307); but some additional details of interest are given in Press messages from New Zealand. A Reuter message states that the interior of Victoria Land is found to rise to a height of 9000 feet, and is evidently a vast continental plateau.

Wilkes Land was found to be non-existent, the *Discovery* sailing over the region where it has been charted. Since Ross's time, the ice is alleged to have broken back 30 miles from the barrier, which is moving northward at the rate of a quarter of a mile a year.

The main practical interest of the expedition lies in the results of the magnetic investigations. Continuous observations were taken in the neighbourhood of the magnetic Pole.

One primitive form of insect life was secured, and much information obtained as to the higher forms of animal life. The latter consisted mostly of birds, including the emperor penguin, specimens of which have not previously been found in these regions. The only species of living plants secured were mosses and lichens, but sandstone fossil remains of dicotyledonous plants from an altitude of 8000 feet were obtained on a sledging trip westward.

The following particulars of the expedition are from an interview which the correspondent of the *Daily Mail* at Christchurch, New Zealand, had with Commander Scott, published in that journal on Saturday last.

All went well after the departure of the *Morning* in 1903. The ice remained fast and firm within four miles of the *Discovery*. The weather was colder but less windy than in 1902. One hundred degrees of frost were recorded in May. The routine of scientific work and observations continued as in the previous year.

Sledging opened in September under the most severe conditions. One party made a depot to the south; another